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ABSTRACT

The question of whether children's accentuation strategies are determined by the linguistically established context was studied. A second investigation determined whether the difference between distinctive and nondistinctive information is marked by the speaker's accentuation, focusing the listener's attention upon the crucial information. In the first study, 9 adults and 30 three- to six-year-old German children produced descriptions of sets of four objects. Children did not use accentuation to mark information that was crucial for the listener to differentiate the target from all other relevant alternatives. Children's accentuation was dependent on what had previously been said, but not on the distinctiveness of the information with regard to the context of referential alternatives. The second study asked the question of whether distinctive, as opposed to nondistinctive, information is systematically stressed when there is no distinction present between given and new information. Accentuation of one of two modifiers was found to be exclusively dependent upon its syntactic position, irrespective of whether it was distinctive or nondistinctive information. Neither experiment supported the assumption that children or adults use accentuation to mark that information that is crucial for the listener's identification of the referent. (SW)

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CHILDREN'S ASSIGNMENT OF ACOUSTIC STRESS IN REFERENTIAL COMMUNICATION

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Introduction

It is generally assumed that the main function of accentuation is to indicate differences in the information structure of speech. One basic distinction with regard to information structure is that between given and new information (Halliday, 1967; Chafe, 1972, 1976; Clark & Haviland, 1977). Although these notions are far from being unequivocally defined, they are most often considered to be related to the preceding linguistic discourse. Thus the claim that accentuation is used to emphasize new as opposed to given information is strongly related to the assumption that accentuation primarily depends upon the previous linguistic discourse. Since the sparse empirical literature on accentuation is mostly based on adult data (v. Katwijk, 1976; Yule, 1979; Nooteboom, Kruyt & Terken, 1980), the primary aim of the present paper is to contribute to the question of whether children's accentuation strategies are likewise determined by the linguistically established context.

Alternatively, accentuation may be used to emphasize information whose significance results from non-linguistic, situational factors. In referential communication, for instance, stress may be used to mark that information which is crucial for the listener to identify a particular referent as opposed to information which is not critical. Descriptions of those objects to which a speaker refers often include more features or information than the addressee would minimally need for an unequivocal identification of the target. In such descriptions one can distinguish that information which is indispensable for an unambiguous characterization of the referent from that information which is not crucial. We will call the first kind of information 'distinctive' and the second kind 'non-distinctive' information.

If, for example, a domain of reference simply consists of a red ball and a red pen, either of the two objects can unequivocally be characterized by a noun like "ball" or "pen". Object-class is distinctive information in this example. In contrast, colour is non-distinctive information. A target referent can be identified on the basis of distinctive information alone. Therefore, distinctive information can be considered the crucial information for the purpose of reference.

A second aim of the work summarized in the present paper was to study experimentally whether the difference between distinctive and non-distinctive information is marked by the speaker's accentuation, focussing the listener's attention upon the crucial information.

The first experiment which will be reported now, investigated

whether children's accentuation depends to a greater extent upon the preceding linguistic discourse or upon non-linguistic, situational factors. This was done by evoking descriptions in which subjects had a choice between stressing either information which was new with regard to the prior linguistic discourse or information which was distinctive with regard to the non-linguistic context of referential alternatives. Here, the term 'new' information is used in a particular way. It stands for 'not mentioned in the preceding utterance'. In contrast, 'given' information stands for 'mentioned in the preceding utterance'. Thus in the present paper the terms 'new' and 'given' information are exclusively defined on the basis of the preceding linguistic context, whereas the terms 'distinctive' and 'non-distinctive' information refer to the non-linguistic context, as explained above.

Experiment I

Method

To study the assignment of acoustic stress in referring phrases, a simple experiment was designed. Four sets of four objects were presented to subjects, one set at a time. The four objects of each set differed as to object-type and colour; each set was constructed by cross matching two different objects with two different colours. An actual set of objects consisted, for instance, of a red and a blue ball, and of a red and a blue car.

The task of the subjects was simply to tell the experimenter which object from each set they liked the best. When the first question with regard to one particular set of objects had been answered, the object which had been described was removed and the same question was asked for the remaining three objects. This strategy was maintained until the last object of each set had been described.

We will take the set of objects mentioned above as an example. If we arbitrarily assume that a child says "the red ball" as his first object-description, either the blue ball, the red car, or the blue car can be chosen as second object (as shown under (a) in Fig.1). If the second choice is "the blue ball" (as shown under (b) in Fig.1), the subject has produced an object-description which differs from the previous one only with respect to the modifier. The colour term 'blue' is the new information in the second description. Therefore, if children's accentuation is determined by what has previously been said, we expect the stress on 'blue' and not on 'ball' in this particular case.

However, still supposing that the blue ball is the second object chosen, the noun 'ball' is the distinctive information for the listener. As a matter of fact, 'ball' would at this point be sufficient for the listener to identify the object referred to by the speaker. Thus if the distinctive information in referential descriptions is systematically marked by accentuation, we expect the stress on the noun 'ball' and not on the modifier 'blue'. As can easily be seen, one comes to opposite expectations with regard to the accentuation of 'blue' or 'ball' depending on whether one supposes that accentuation is determined by the linguistic or by the non-linguistic context.

If, for his second choice, a subject does not utter "the blue ball", but "the red car" (as shown under (c) in Fig.1), the problem is reversed with respect to word-class and word-order. In this case the modifier 'red' is the distinctive information, since there are no other red objects left. Therefore, if accentuation is used to mark the distinctive and not the linguistically contrastive information, in this case the first element which is now a modifier should be accented. Thus, the experiment was controlled for word-class and word-order.

Finally, if a subject chooses as second object the third alternative, saying "the blue car" (as shown under (f) in Fig.1), both elements, the modifier as well as the noun, are distinctive and new information at the same time. Therefore, an analysis of this case does not contribute to the question of whether distinctive or new information is systematically stressed.

However, this question could furthermore be answered by an analysis of descriptions referring to the third object chosen. Depending on the succession of the previous choices, either the noun or the modifier were distinctive with regard to the remaining alternatives, or new compared to the preceding object description (as shown under (d) and (e) in Fig.1). Therefore, the analysis of third descriptions could directly be related to the analysis of second descriptions.

(a)

first choice	red ball
remaining objects	blue ball, red car, blue car

(f)

preceding description	red ball
current description	blue car
remaining objects	red car, blue ball

	(b)	(c)	(d)	(e)
preceding description(s)	red ball	red ball	red ball red car	red ball blue ball
analyzed description	blue ball	red car	blue car	blue car
remaining object(s)	red car, blue car	blue ball, blue car	blue ball	red car

Information underlined = distinctive information

Figure 1: Succession of choices over time (Experiment I)

As has been found in many studies of referential communication, children in particular often produce inadequate descriptions, missing features which the listener needs to differentiate the target from the context (for reviews of the literature, see for example, Glucksberg, Krauss & Higgins, 1975 or Shatz, 1978). Since such descriptions do not contribute to the main question of the present paper, they were not considered for further analyses. Rather, the data analysis was restricted to those cases in which each of the first three descriptions of one set of objects consisted of an article plus the appropriate modifier and noun. In this way all descriptions being analyzed were identical with regard to their formal linguistic structure.

Tape-recordings of such descriptions were presented to five judges who were asked to place the main accents on a verbal transcript, whenever a main accent was discernible for any particular description.

Results

Children's data

Thirty German children, aged 3 to 6 years, participated in the study. They produced 37 descriptions of sets of four objects which remained for further consideration. A tape-recording of these descriptions was presented to the judges.

Out of this data pool, 26 individual object-descriptions, descriptions referring to second or third-chosen objects, could appropriately be used for the investigation of the main question of the present paper. Eventually, 24 referring phrases were analyzed, since only those descriptions were considered where at least four of the five judges had consistently perceived the stress on the same word.

On the basis of these analyses, the main question of the present paper can be answered very clearly: children did not use accentuation to mark that information which was crucial for the listener to differentiate the target from all other relevant alternatives. Rather, in all 24 descriptions stress was used contrastively with regard to the preceding object-description. Thus, children's accentuation was dependent on the preceding linguistic context, not on the context of referential alternatives. This result is consistent for the descriptions of objects which differ from the previous chosen ones in class-membership or in colour, as well as for the descriptions referring to the second or the the third-chosen object. Thus, the results are confirmed by single comparisons across different conditions.

Adults' data

The results just reported may be age-specific. Only children may fail to stress that information which is crucial for the listener's identification of the referent, since they do not yet appropriately differentiate between distinctive and non-distinctive information. This may have been the reason why their accentuation was exclusively determined by the preceding utterance.

This hypothesis was tested in a follow-up experiment with adults. The method used was exactly the same as in the experiment with children. Nine students participated as subjects. Again, the results are consistent: adults too always stressed that information which was contrastive

to the previous description, but never that information which was distinctive with regard to the set of eligible referents. Therefore, the adult data rule out the hypothesis that the main result of the first experiment can be explained by developmental deficits concerning abilities to differentiate between distinctive and non-distinctive information.

Random order presentation

A methodological factor which may have influenced the outcome of Experiment I concerns the order in which the descriptions were presented to the judges. Since the judges listened to the object descriptions in the same succession in which they had originally been produced, it is possible that they very early formed a hypothesis about the assignment of stress in successive object-descriptions. Their perception of accents in later descriptions could then have been biased by their own hypothesis. In order to check for this possibility, the individual object-descriptions were presented to another group of judges in random order. This was done both with the children's and with the adults' utterances. The data analysis revealed not a single case that was contradictory to the previous results. Therefore this hypothesis could be ruled out as well.

Experiment II

In Experiment I distinctive information was given information as well and non-distinctive information coincided with new information. Thus, in interpreting the data of the first experiment, one must take into account the speaker's trade-off between acoustically differentiating distinctive from non-distinctive information on the one hand, and new from given information on the other. The results indicate that with regard to accentuation, new information has priority over distinctive information at least in successive noun phrases as produced in the experiment. A second experiment investigated whether children's and adults' accentuation strategies do depend on the non-linguistic context - that is on the distinctiveness of information - in descriptions to which the given/new distinction could not be applied.

Furthermore, it is conceivable that in Experiment I the removal of those objects which had already been described did not reduce the domain of objects which the speakers actually referred to. In producing their descriptions they may have compared a particular object not only with those other objects which still remained, i.e. were visible for both speaker and hearer, but also with those objects which already had been removed, but which initially belonged to the particular domain of reference.

In this case the distinction between distinctive and non-distinctive information would be irrelevant. If the domain of objects to which the speakers actually referred continued to consist of all four objects, the unequivocal characterization of any of those objects would need to include both the appropriate modifier and the appropriate noun in the description. Thus none of the two elements could be considered non-distinctive information. Both the modifier and the noun would be distinctive information. The method of Experiment 1 would then

have been inappropriate to study the question of whether distinctive information is usually accented as opposed to non-distinctive information.

Experiment II was designed to avoid this problem of interpretation, since each individual description referred to a different domain of reference. Therefore, the overspecification of descriptions in Experiment II did not depend on the assumption that the reduction of the visible domain of reference is actually paralleled by a reduction of the domain of reference to which the speaker refers.

In Experiment II subjects were shown a series of 40 slides, each representing a set of 6 or 8 familiar objects. The objects of one set differed as to object-type, colour, and size in varying combination. Subjects were asked to choose any one, but only one of the objects of each set and to unambiguously communicate their choice to the experimenter. By varying the number of features which were necessary for an unequivocal characterization of a target referent across the sets of objects, subjects produced many overspecified descriptions. For our present purposes descriptions were analyzed which consisted of two modifiers and one noun. In all cases the noun and one modifier were distinctive, the other modifier was non-distinctive information (see Fig.2). Only those descriptions were considered which were not preceded by utterances in which the same words had been used.

Domains of Reference	big red ball big blue ball big red car big blue car	small blue ball big blue ball small blue car big blue car
overspecified descriptions	big <u>blue</u> <u>ball</u>	<u>big</u> blue <u>ball</u>

Information underlined = distinctive information

Figure 2: Examples of descriptions analyzed in Experiment II

Sixteen children aged 7 and 8 years produced 42 descriptions of that kind. In 25 of these descriptions the noun and the first modifier were distinctive information. In the remaining 17 descriptions the noun and the second modifier were distinctive information. Since the noun was always distinctive with regard to the domain of eligible referents, the analysis concentrated on the two modifiers. Tape-recordings of all 42 descriptions were presented to a new group of judges who were asked to indicate whenever an accentual difference was discernible, which of the two modifiers of each description was more strongly accented.

Results are again unequivocal. In all cases of consistent judgments, the stress was perceived on the first of the two adjectives, irrespective of whether it was distinctive or non-distinctive. Again, a group

of adults served as control for age effects. The same results came out. Thus, it was the position of the corresponding word and not its significance for the listener's identification of a target referent in context, which determined which of the two modifiers was accented.

Conclusions

Two experiments have been reported. In the first experiment the question was raised whether children's accentuation in referential communication is determined by the preceding linguistic context or by non-linguistic, situational factors. We found that children's stress always depended upon what had previously been said, but not on the distinctiveness of the information with regard to the context of referential alternatives.

Experiment II asked the question whether distinctive, as opposed to non-distinctive, information is systematically stressed when there is no distinction present between given and new information. It turned out that accentuation of one of two modifiers was exclusively dependent upon its syntactic position, irrespective of whether it was distinctive or non-distinctive information. Thus in neither experiment did we find support for the assumption that children or adults use accentuation to mark that information which is crucial for the listener's identification of the referent.

This general result calls into question the assumption that the analytical distinction between distinctive and non-distinctive information in referential communication is actually paralleled in the production and comprehension of natural language. Support for questioning this assumption comes from a comprehension study by Deutsch (1976). The main result of this experiment was that the time needed by listeners to identify a target referent was shorter for redundant object-descriptions than for non-redundant ones. According to Deutsch this finding can best be explained by assuming that listeners follow a so-called 'object-centered search strategy'. This means that the listener internally generates a representation of the target as soon as he has heard a description of it. On the basis of this representation he then tries to find the intended referent by searching for an entity which matches the model represented in memory. The more explicit the description is, the more precise the representation will be, and, consequently, the easier it will be for the listener to identify the referent.

If listeners actually follow such an identification strategy, then, of course, the inclusion of non-distinctive features in an object-description will facilitate the listener's task. Consequently, the speaker's accentuation of distinctive features would be of minor importance. The data of the present production experiments are in accordance with such a hypothesis.

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